

CLAIMS

WHAT IS CLAIMED IS:

1. A mixing device comprising:

5 a mixer having an internal mixing chamber having a first inlet, a second inlet, and an outlet;

10 a pump adapted to deliver a first fluid to the mixing chamber of the mixer via the first inlet; and

15 a gas-supersaturated fluid supply assembly adapted to deliver a second fluid having a liquid phase supersaturated with a gas to the mixing chamber of the mixer via the second inlet to mix with the first fluid and form a mixed fluid.

20 2. The device, as set forth in claim 1, wherein the gas-supersaturated fluid supply assembly is adapted to deliver a second fluid having a liquid phase supersaturated with a gas and a gas phase to the mixing chamber of the mixer via the second inlet to mix with the first fluid and form a mixed fluid.

25 3. The device, as set forth in claim 2, wherein the gas phase of the second fluid comprises oxygen.

4. The device, as set forth in claim 1, wherein the gas is oxygen.

5. The device, as set forth in claim 1, wherein the liquid phase of the second fluid comprises physiologic saline.

6. The device, as set forth in claim 1, wherein the first fluid comprises blood.

7. The device, as set forth in claim 1, wherein the gas is dissolved in the mixed fluid in greater levels than in the first fluid.

8. The device, as set forth in claim 1, wherein the mixed fluid comprises hyperoxic blood.

9. The device, as set forth in claim 1, wherein the mixed fluid comprises hyperbaric blood.

10. The device, as set forth in claim 1, wherein the first inlet is arranged to create a cyclonic flow in the mixing chamber.

11. The device, as set forth in claim 1, wherein the second inlet is arranged so that the second fluid enters the chamber in a generally upward direction.

12. The device, as set forth in claim 1, wherein the second inlet is arranged so that the second fluid enters the chamber in a direction normal to the initial direction of travel of the first fluid entering the chamber.

13. The device, as set forth in claim 1, wherein the mixing chamber is pressurizable.

14. The device, as set forth in claim 1, comprising a control assembly coupled to the pump.

15. The device, as set forth in claim 14, comprising a display coupled to the control assembly.

16. The device, as set forth in claim 1, wherein the pump receives the first fluid from a fluid supply.

17. The device, as set forth in claim 1, wherein the pump receives the first fluid from a patient.

18. The device, as set forth in claim 1, comprising a fluid delivery apparatus adapted to deliver the mixed fluid to a destination site.

19. The device, as set forth in claim 18, wherein the destination site comprises a patient.

20. The device, as set forth in claim 1, comprising a tube coupling the pump to the mixer, the tube adapted to deliver the first fluid.

21. The device, as set forth in claim 1, comprising a capillary assembly coupling the gas-supersaturated fluid supply to the mixer.

22. The device, as set forth in claim 21, wherein the capillary assembly comprises a single capillary.

23. The device, as set forth in claim 21, wherein the capillary assembly comprises a plurality of capillaries.

24. A device for mixing blood and a fluid including a dissolved gas comprising:
a mixer having an internal mixing chamber having a first inlet, a second inlet, and an outlet, the first inlet being arranged to create a vortical flow within the mixing chamber.

25. The device, as set forth in claim 24, comprising a pump adapted to deliver blood to the mixing chamber of the mixer via the first inlet.

26. The device, as set forth in claim 25, comprising a gas-supersaturated fluid supply assembly adapted to deliver an oxygen-supersaturated fluid to the mixing chamber of the mixer via the second inlet, the blood and oxygen-supersaturated fluid mixing with one another to form a mixed fluid.

27. The device, as set forth in claim 26, wherein the second fluid comprises physiologic saline.

28. The device, as set forth in claim 24, wherein the mixing chamber comprises a substantially cylindrical wall and wherein the first inlet is arranged to direct fluid along a path substantially tangential to the cylindrical wall.

29. The device, as set forth in claim 24, wherein the second inlet is arranged to direct the second fluid in a generally upward direction.

30. The device, as set forth in claim 24, wherein the second inlet is arranged to direct the second fluid in a direction normal to the initial direction of travel of the first fluid entering the chamber.

31. The device, as set forth in claim 24, wherein the mixing chamber is pressurizable.

32. The device, as set forth in claim 25, comprising a control assembly coupled to the pump.

33. The device, as set forth in claim 32, comprising a display coupled to the control assembly.

34. The device, as set forth in claim 26, wherein the pump receives the blood from a patient.

35. The device, as set forth in claim 26, comprising a fluid delivery apparatus adapted to deliver the mixed fluid to a destination site.

5 36. The device, as set forth in claim 35, wherein the destination site comprises a patient.

37. The device, as set forth in claim 26, comprising a tube coupling the pump to the mixer, the tube adapted to deliver the first fluid.

10 38. The device, as set forth in claim 26, comprising a capillary assembly coupling the gas-fluid supply to the mixer.

39. The device, as set forth in claim 38, wherein the capillary assembly comprises a single capillary.

15 40. The device, as set forth in claim 38, wherein the capillary assembly comprises a plurality of capillaries.

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